

Remarks

In the amendment to the specification made *supra*, paragraph 25, having to do with grain refiners, was amended. The word “optionally” was removed from the paragraph because all the claims remaining in the application include grain refiners. The inclusion of zirconium in the list of grain refiners was removed. Communication with the inventors established that zirconium has a grain refining effect only during solid state processes which cause secondary recrystallization. Since the present patent has to do with solidification, not solid state processing, zirconium was removed from the list of grain refiners.

In the office action, the examiner made some statements regarding claim interpretation. Regarding independent claims 36 and 50, the examiner interpreted these to refer to the exact 7050 or 7055 alloy. Agent for the applicants notes that in paragraph [0022] of the specification, it is stated that all numbers or expressions referring to quantities of ingredients are to be understood as modified in all instances by the term “about”. Accordingly, claim 36 is interpreted to mean having about the composition of the Aluminum Association 7050 alloy. Likewise, claim 50 is interpreted to mean having about the composition of the Aluminum Association 7055 alloy.

Regarding claims 43, and 57, the examiner interprets the grain refiners to be in addition to zirconium. This view is supported by paragraph [0026] in the specification. In that paragraph, the term “grain refiners” as used in the specification, is defined. Titanium, boron and carbon are cited in that paragraph, zirconium is not. The reference to zirconium in paragraph [0025] of the specification of the instant application has been removed in the amendment made *supra*. Accordingly, the examiner’s interpretation of claims 43 and 57 is believed to be correct.

Regarding claims 36 for the AA7050 alloy and 50 for the 7055 composition, the examiner has interpreted the grain refiners to not be in addition to those compositions. Agent for the applicants agrees. However, the examiner cites zirconium as a grain refiner, and this is believed to not be correct because, as discussed *supra*, zirconium is not

a grain refiner during the solidification process. This view is consistent with the amendment to paragraph [0025] supra.

In the office action, the examiner rejected claims 16 and 22-24 under 35 U.S.C. 102(b) as being anticipated by Igarashi (US 2,166,496 A). Igarashi teaches a 7000 series aluminum alloy comprising 200 ppm calcium (Example 4), which falls in the ranges of claims 16 and 22-24.

In the amendment to the claims made supra, the range of calcium in the alloy of claim 16 is changed to 5 ppm to 100 ppm. This is in accordance with example 5 In Table 1 and the discussion in paragraph [0035]. This example is for a 7000 series aluminum alloy comprising 53 ppm of calcium. Claim 22 has been cancelled, and the alloys of claims 23 and 24, being dependent from claim 16, have the same upper range of calcium as claim 16. It is believed, therefore, that these claims, as amended, are no longer anticipated by Igarashi. The examiner, therefore, is respectfully requested to withdraw his rejection of claims 16, 23 and 24 based on Igarashi.

In the amendment to claim 19 made supra, zirconium was removed from the list of grain refiners because the grain refining effect of zirconium occurs only during solid state processing. This is believed to not introduce new information.

Further, in the office action, the examiner rejected claims 16, 19, 21-25, 36, 37, 42, 50, 51 and 56 as being unpatentable over Murtha (US 5,496,426 A). Murtha teaches an aluminum alloy having less than 0.02% Ca (less than 200 ppm). The examiner stated that this is an overlapping composition.

Agent for the applicant respectfully disagrees. Murtha clearly teaches that calcium is an undesirable impurity. The following text is copied from Murtha column 5, line 51-56:

“... It is neither necessary or advantageous or sufficient for the invention alloy composition to include any nickel, calcium or chromium. The products in accordance with the invention exhibiting greater combinations of properties hereunder are substantially nickel-free, calcium-free and chromium-free”.

Nowhere in Murtha is there any statement that calcium has any beneficial effects. Murtha refers to calcium in the context of non-ideal conditions such that minor amounts of undesirable contaminants may find their way into the alloy. (Column 5, lines 56-62). Murtha, clearly, teaches away from the addition of calcium. The addition of calcium to an aluminum alloy to obtain beneficial properties would, therefore, not be obvious based on Murtha. Accordingly, the examiner is respectfully requested to withdraw his rejection of claims 16, 19, 21, 23-25, 36, 37, 42, 50, 51 and 56 of the instant application under 35 U.S.C. 103 based on Murtha.

Further, in the office action, the examiner rejected claims 19, 21 and 25-27 under 35 U.S.C. 103(a) based on Igarashi (US 2,166,496 A). Agent for the applicants notes that claims 19, 21 and 25-27 all depend from claim 16. In the amendment made *supra*, claim 16 was amended to restrict calcium to the range from about 5 ppm to about 100 ppm. This change to the upper limit of the calcium was obtained from data in the specification. These claims are for a 7000 series alloys.

Paragraph [0034] in the specification describes ingots having results presented in Table 1. Example 5 in that table is for a 7000 series alloy having 53 ppm calcium.

It is not obvious to determine exactly what Igarashi was teaching. In the one table, four samples having calcium are presented. These have concentrations of 0.02, 0.04, 0.05, 0.03 wt %. The one claim is for alloys having calcium in the range from 0.01 wt % to 0.02 wt %. Only one of the test pieces cited in the table fall within the range of the claim, and it is at the extreme upper limit for calcium.

Igarashi presents no data for calcium levels below 0.02 wt %. It is believed, therefore, that it is not obvious to employ calcium in the range from 5 to 100 ppm (0.005 to 0.01 wt %).

Inasmuch as claims 19, 21 and 25-27 all depend from claim 16 and have calcium in a range below 0.01%, a range for which Igarashi cites no examples, it is believed that these claims are in no way taught or suggested by Igarashi. Accordingly, the examiner is

respectfully requested to withdraw his rejections of claims 19, 21 and 25-27 under 35 U.S.C. 103(a) based on Igarashi (US 2,166,496 A).

The examiner, further, in the office action, objected to claims 28-35, 38-41 and 52-55 as being dependent upon rejected base claims.

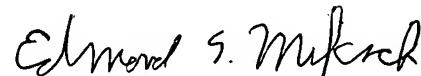
Agent for the applicants notes that claims 28-35 depend from claim 16 which, following the amendment made *supra*, and the discussion, is believed to be patentable. Accordingly, the examiner is respectfully requested to withdraw his objections to claims 28-35.

Likewise, it is noted that claims 38-41 depend from claim 36 which, following the amendment made *supra*, and the discussion, is believed to be patentable. Accordingly, the examiner is respectfully requested to withdraw his objections to claims 38-41.

Finally, it is noted that claims 52-55 all depend from claim 50 which, following the amendment made *supra*, and the discussion, is believed to be patentable. Accordingly, the examiner is respectfully requested to withdraw his objections to claims 52-55.

As a result of the preceding amendments and the discussion, it is believed that the application is now in condition for allowance, and a Notice of Allowance is earnestly solicited.

Respectfully submitted,



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Effect of Calcium on 7050 Ingot Cracking - No Beryllium
Grain Refined with Ti-C

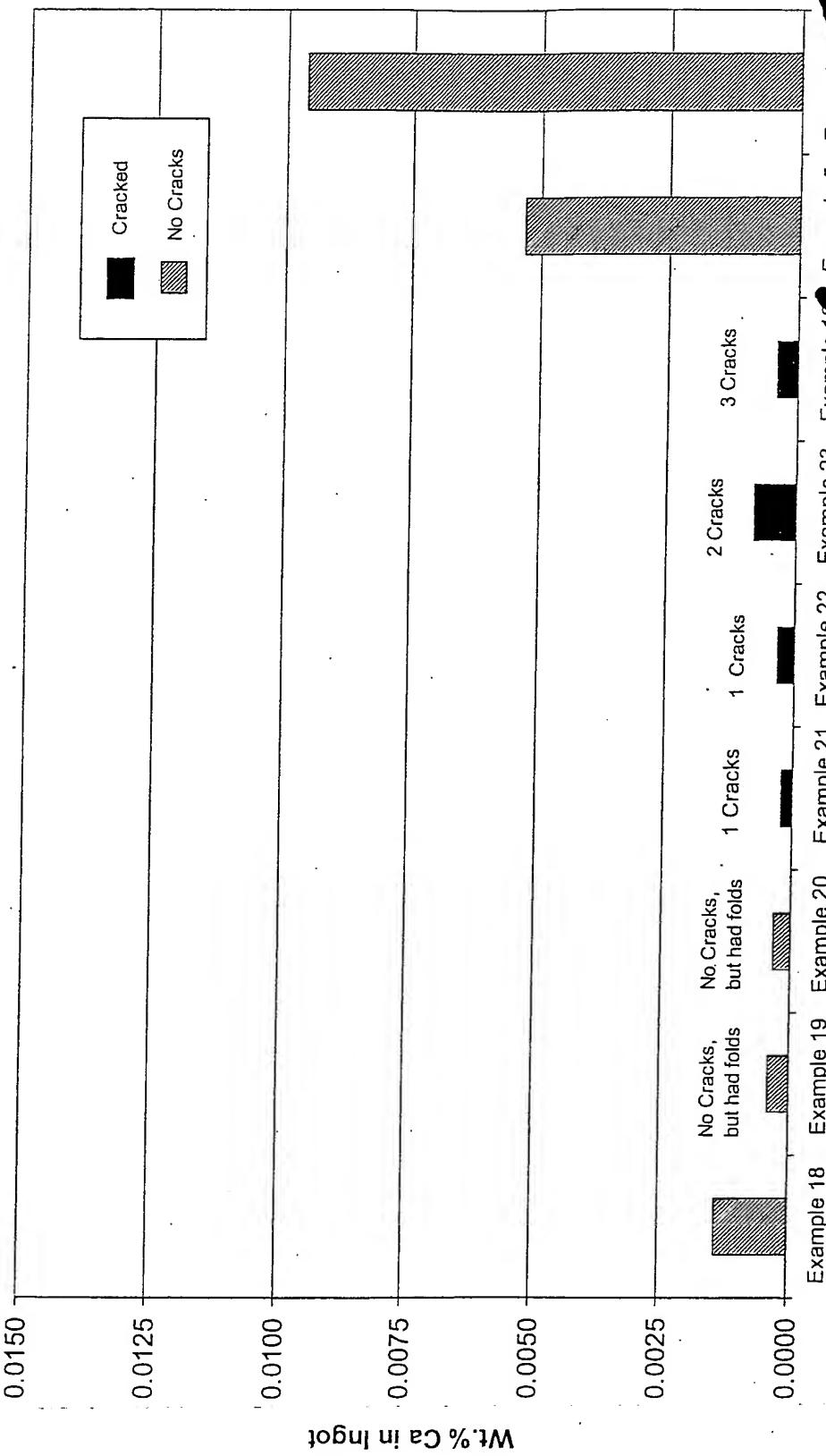


Fig. 6b

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